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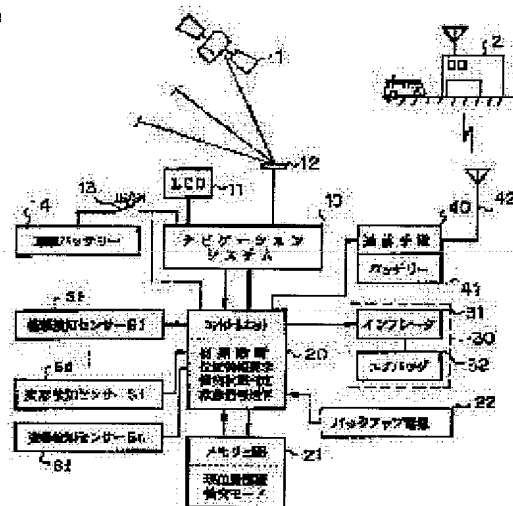
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## (54) VEHICLE ACCIDENT NOTIFICATION SYSTEM

## (57)Abstract:

**PURPOSE:** To automatically notify the first-aid notification at the time of the generation of an accident from the side of the person involved in the accident to a prescribed first-aid system.

**CONSTITUTION:** The present positional information when an automobile runs based on the measured data obtained by acquiring the GPS satellite 1 that a navigation system 10 for automobile possesses is requested by the positional information request circuit within a control unit 20 at prescribed time interval. The read present positional information is stored in a memory circuit 21. Next, whether an air bag device 30 is operated or not is decided based on the shock detection signal from a shock detection sensor SG by a collision state decision circuit. Subsequently, after the signal operating at least the air bag device 30 is outputted, the present positional information stored in the memory circuit 21 is outputted as first-aid signal transmission data to a communication means 40 by a first-aid signal transmission command circuit. The transmission data is transmitted to a prescribed radio facility 2 having a first-aid command system via the communication means 40 and the generation of an accident is notified.



**CLAIMS****[Claim(s)]**

**[Claim 1]**A motor vehicle accident informing system comprising:

An air bag device.

A navigation system for cars which holds positioning data produced by catching a GPS Satellite.

A position information request circuit which accumulates said read present position information in a memory circuit while requiring present position information at the time of a run based on said positioning data with a predetermined time interval.

A collision state decision circuit which judges whether said air bag device is operated based on a shock detect signal from an impact detection sensor, A control unit which has a hurry call transmission-commands circuit which outputs said present position information accumulated in said memory circuit as hurry call send data after a signal which operates said air bag device at least is outputted, A means of communication which transmits said hurry call send data to predetermined radio aids which have emergency instruction organization, and notifies an accident occurrence to them.

**[Claim 2]**The motor vehicle accident informing system according to claim 1, wherein, as for said present position information, latitude data, longitude information, and a running azimuth are accumulated in RAM in said memory circuit at least.

**DETAILED DESCRIPTION****[Detailed Description of the Invention]****[0001]**

**[Industrial Application]**In this invention, a motor vehicle accident informing system is started, especially accident occurrence position information is notified as a hurry call at the time of the occurrence of a motor vehicle collision.

Therefore, it is related with the motor vehicle accident informing system which enabled it to perform a quick and exact emergency activity.

**[0002]**

**[Description of the Prior Art]**The air bag device has been adopted as many types of a car as an auxiliary arresting gear which protects a crew member from the impulse force produced at the time of a car crash effectively. The purpose of this air bag device catches the body especially head, and thorax of the crew member who moved ahead in the state where it was restrained by the seat belt device at the time of a collision with the bag-like cushion with which gas was filled, and there is in preventing a crew member from a secondary collision in the car. Thus, in the latest car, even if a collision occurs, the policy which makes damage caused by a collision the minimum by equipment for the security after the collision of a seat belt device, an air bag device, etc. is taken.

**[0003]**On the other hand, when it was an accident in which a grade is light when a collision etc. happen, the crew member of the accident vehicle notified the generation place of an accident, and the situation of the accident to the police station or the fire department by the emergency phone which has him in a public telephone or a road side by itself, and was waiting for arrival of an ambulance etc. When the crew member was seriously wounded or it was unconscious, unless the report of the accident from the neighboring witness was received, the rescue crew was not able to acquire the information on an accident occurrence. Thus, unlike the train etc. by which operation management is carried out periodically, in a mobile like a car, the others were not able to know the present position one by one. On the other hand, what is called a navigation system for cars has spread quickly for a general vehicle in recent years as an example of application of GPS (global positioning system: GlobalPositioning Sysytem) using a satellite. For this reason, in the vehicles which carry the navigation system for cars, the position information on a self-vehicle can be immediately acquired now based on a GPS positioning result.

**[0004]**

**[Problem(s) to be Solved by the Invention]**By the way, if vehicles collide, in an air bag device, a control unit will recognize the grade of a collision electrically based on detection signals, such as impact acceleration at the time of the collision sent from the collision detecting sensor. It is judged whether an air bag device is operated. And the Squibb signal (ignition signal) as an operating command signal of an air bag device is outputted to an inflator if needed. Now, the air bag device itself exhibits an original function, and the operation as protective gear completes it.

**[0005]**On the other hand, at the above-mentioned navigation system for cars, information, including the position of vehicles, etc., is displayed into the electronic map on a display in real time at the time of a run. Thereby, the crew member can check the position information on a self-vehicle visually on a map. However, since this position information is updated with a predetermined time interval based on GPS positioning data, it remains in the check of the position information on that time. Thus, as equipment as for which one side ensures a crew member's safety, another side constituted the system which became independent as equipment for assistance of a run of a car, respectively. While especially the navigation system for cars held present position information at the time of a run, the information was not harnessed at all at the time of an accident occurrence.

**[0006]**Then, the position information which the purpose of this invention canceled the problem which the Prior art mentioned above has, and was acquired by the navigation system for cars at the time of the collision of a car as position information, It is in providing the motor vehicle accident informing system which enabled it to transmit to the radio-aids office which furthermore acquires the grade of a collision from a mounted sensor, and has emergency instruction organization by making these information into a hurry call.

**[0007]**

**[Means for Solving the Problem]**To achieve the above objects, a thing, wherein this invention is provided with a control unit and a means of communication which transmits send data as said hurry call to predetermined radio aids which have emergency instruction organization, and notifies an accident occurrence to them characterized by comprising the following.

Air bag device.

A navigation system for cars which holds positioning data produced by catching a GPS Satellite.

A position information request circuit which accumulates said read present position information in a memory circuit while requiring present position information at the time of a run based on said positioning data with a predetermined time interval.

A collision state decision circuit which judges whether said air bag device is operated based on a shock detect signal from an impact detection sensor, A hurry call transmission-commands circuit which outputs said present position information accumulated in said memory circuit as hurry call send data after a signal which operates said air bag device at least is outputted.

[0008]As for said present position information, it is preferred to accumulate latitude data, longitude information, and a running azimuth in RAM in said memory circuit at least.

[0009]

[Function]While requiring the present position information at the time of the run based on the positioning data produced by catching the GPS Satellite which the navigation system for cars holds in this invention with a predetermined time interval by the position information request circuit in a control unit, Accumulate said read present position information in a memory circuit, and it is judged whether an air bag device is operated based on the shock detect signal from an impact detection sensor in a collision state decision circuit, After the signal which operates said air bag device at least is outputted, It outputs to a means of communication by using as hurry call send data said present position information accumulated in said memory circuit by the hurry call transmission-commands circuit, An accident occurrence position can be checked at an early stage at the time of an accident occurrence by transmitting the send data as said hurry call to the predetermined radio aids which have emergency instruction organization via this means of communication, and having notified the accident occurrence to them.

Therefore, an emergency vehicle etc. can mobilize and arrive promptly and treatment after an accident, transportation in the injured's hospital, and accommodation can be performed promptly.

[0010]As said present position information, the position of an accident site can be correctly checked based on the run state of the car at the time of a run by accumulating latitude data, longitude information, and a running azimuth in RAM in said memory circuit at least.

[0011]

[Example]One example of the motor vehicle accident informing system by this invention is described with reference to an accompanying drawing below. Drawing 1 is a system configuration figure of a motor vehicle accident informing system. The navigation system for cars in a figure (it is hereafter described as the navigation system 10.) can use any type of the hybrid system which used together now the GPS system or autonomous navigation developed and marketed. The display 11 of LCD etc. is connected to this navigation system 10 so that a crew member can check position information on a map. The GPS antenna 12 attached to the body roof receives the GPS signal acquired by catching GPS Satellite 1. In this example, the thing of eight parallel is used for the receiving method. If RIMOTO Contra's (not shown) switch is turned on like the publicly known navigation system 10 when using the navigation system 10 at the time of a run, predetermined information and menu will be displayed on the display 11. In the navigation system 10, the various position information and pertinent information pass the position information correcting program of GPS receiving data and a system are held. Among these, the vehicle speed and a run vector besides the latitude as basic data and longitude information is handed over by the control unit 20.

[0012]The control unit 20 is a control unit which comprised 1 chip MPU, and comprises an initial diagnosing circuit, a position information request circuit, a collision state decision circuit, and a hurry call transmission-commands circuit greatly at this example. Among these, an initial diagnosing circuit is a circuit which checks the normal operation of various circuits and a various sensor before a run. If a driver makes the ignition switch 13 an energization condition, a dummy signal will flow into an initial diagnosing circuit, and the existence of the abnormalities of opening of a circuit, a short circuit, or each part will be checked.

[0013]A position information request circuit outputs the signal which the position information on the present position which the navigation system 10 holds to the navigation system 10 with a predetermined time interval requires. On the other hand, from the navigation system 10 side, the position information on a predetermined data form is outputted irrespective of ON of the navigation system 10, and an OFF state to the control unit 20.

[0014]Among this position information, GPS receiving data may still be sufficient as latitude and longitude information, and the information amended via correcting programs, such as autonomous navigation, may be sufficient as them. Although not shown in drawing 1, when differential GPS (DGPS) is adopted, it is preferred to have a receiver which receives the DGPS data link transmitted from a reference station. And it may be made for

the control unit 20 to require the data amended with differential amendment data of the navigation system 10. The publicly known decision circuit for operating the air bag device 30 can be used for a collision state decision circuit. Usually, when the detection signal from the carried impact detection sensor SG exceeds a predetermined threshold impact resistance value, the Squibb signal to the inflator 31 is outputted. The safety sensor for the prevention from accidental bombing besides the impact detection sensor SG may be carried, and the AND circuit of a safety sensor and the impact detection sensor SG may be formed.

[0015] On the other hand, in order to operate the air bag device 30, two or more detecting sensor  $S_i$  ( $i=1-n$ ) is connected to the collision state decision circuit of the control unit 20. These detecting sensor  $S_i$  is distinguishable in the impact detection sensor SG directly related to expansion of the air bag 30, and the additional sensor for acquiring the collision state information at the time of an accident report, although it does not contribute to the operation of an air bag device directly. There is the modification detecting sensor  $S_d$  as a latter example. This can grasp an accident condition independently [ the impact detection sensor SG ], when the frame and side door beam of the body are equipped and a door and a frame are greatly distorted by side collision etc. When vehicles sideslip, it can be recognized as the attitude-sensing sensor  $S_f$  detecting the unusual inclination of vehicles, and being in an accident state. It is also preferred to also prepare the cross member of RIYA the impact detection sensor SG or the modification detecting sensor  $S_d$ . When a detection signal which exceeds a predetermined threshold also when impulse force is not inputted in the direction which operates the air bag device 30 by this is outputted, an accident report can be carried out under the condition that a major accident occurs. An outbreak of the fire accompanying an accident can also be known by carrying the temperature detection sensor. The serious damage part can know various collision states, such as somewhere, for whether a collision being a head-on collision, and it being a slanting collision, being a side collision, or being a rear-end collision or the body is greatly damaged from these detection signal values and signal patterns. This collision state is made to compare with the conflicting mode stored in the state where it was systematically classified into the memory circuit, can put that conflicting mode information on a hurry call with position information as information in case of an accident, and can also be transmitted.

[0016] RAM in which the memory circuit 21 can accumulate present position information and conflicting mode information, It consists of an EEPROM which classifies systematically the collision state corresponding to a body number, a type of a car, owner information and the detection signal value acquired from various kinds of detecting sensors at the time of an accident occurrence, and a signal pattern, and is carrying out memory storing as conflicting mode.

[0017] In the hurry call transmission-commands circuit of the control unit 20. After the Squibb signal of the inflator ON is outputted, the detecting signal of a detecting sensor predetermined also in an inflator-on judging not coming out, either exceeds a threshold, When it can be recognized as the occurrence of a major accident, but it is stored in RAM, the newest position information and the conflicting mode information at the time of a collision are read, and data is sent to the means of communication 40.

[0018] The backup power supply 22 is a standby power source when the current supply to the control unit 20 is cut off by breakage of the mounted battery 14, and open circuit of electric wiring. A large capacity capacitor is used and it is in the state of always charging. Even if wiring is disconnected by breakage of the body, etc. by this, the collision state decision circuit in the control unit 20, a hurry call sending circuit, and RAM are backed up, and reservation of circuit operation and memory disappearance can be prevented.

[0019] The inflator 31 and the air bag 32 which constitute the air bag device 30 are a publicly known device. If it is judged with the inflator ON by a collision judgement by the control unit 20, the inflator 31 operates with the Squibb signal from the control unit 20, and it has come to be able to carry out the expansion deployment of the air bag 30.

[0020] As the means of communication 40, the car telephone is used by this example. Autodial of the emergency call is carried out to the radio aids 2 which are transmission destinations by the hurry call sending circuit, and The body number as initial data, a type of a car, and owner information, As a tone signal, the accident occurrence position information and conflicting mode information which were accumulated in RAM are repeatedly transmitted until response confirmation of the partner point is carried out. As this means of communication 40, publicly known various means of communication, such as cellular phones, such as a cellular phone, personal communications, quasi microwave band (1-3 GHz) radio, and mobile satellite communication, are employable. The situation of the circumference obtained by the FM multiplex broadcast, the light beacon, and the radio wave beacon as position supplementary information around an accident site can also be transmitted collectively. The means of communication 40 has the battery 41 for exclusive use. It is preferred to consider it as the device which checks the consumption degree of this battery 41 in the initial diagnosing circuit of the control unit 20, and can be charged if needed.

[0021] In the case of a public line, as the radio aids 2 provided with the emergency instruction organization of a

transmission destination, the organization of the police which receives an emergency call is mentioned as an example. While notifying a specific security company using a personal radio, mobile satellite communication, etc. and getting No. 119 and No. 110 to contact from there, the original support organization of a security company can also be received. Although various signaling protocols of a hurry call and data forms are considered, if predetermined emergency data is first transmitted from an accident vehicle by one-way communication and completion of data transmission and reception is checked, it may set up become the analog two-way communication as conversation mode. If it is in the state where the crew member of an accident vehicle can talk at this time, the emergency establishment can know the situation of a more detailed accident, and the injured's condition.

[0022] Drawing 2 is a mimetic diagram showing the example which carries the component of the system shown in drawing 1 in a real vehicle. The navigation system 10 and the control unit 20 are arranged at the cockpit front portion. LCD display 11 is built into the instrument panel. The Squibb signal wire is connected to the inflator 31 accommodated in the steering wheel from the control unit 20. On the other hand, the flat disc-like GPS antenna 12 is being fixed to the roof rear. Housing and holding of the communication apparatus 40 is carried out to the high portion of the body rigidity near the rear wheel axle. The pole antenna 42 is installed from the body of the rear trunk position. As a sensor, front shock detecting sensor SG1, rear impact detection sensor SG2, and the modification detecting sensor Sd (side door beam) are illustrated in illustration.

[0023] Next, the operation order of the control unit 20 is explained with reference to drawing 3. First, when a driver makes the ignition switch 13 ACC or ON, it energizes from the mounted battery 14 and an initial diagnosing circuit program is executed (Step 100,110). When abnormalities are discovered at this time, the malfunction of a system is told to a driver by carrying out the continuous light of the alarm lamp of an instrument panel, for example. Subsequently, the positioning data update circuit of the navigation system 10 is started automatically (Step 120). When there is no main part of the navigation system 10 in an ON state at this time, it is not indicated by a display, but renewal of the positioning data as position information is performed. A regular interval (for example,  $\Delta t = 1$  second) may be sufficient as the interval of this updating time, and it is a speed induction method, and it may be made to make an interval small as speed increases. A position information request signal is outputted from the control unit 20 to this navigation system 10 (Step 130). The newest present position information is read from the navigation system 10, and it is written in RAM. The output signal from each sensor can be incorporated now into a collision state decision circuit one by one during a run. In a collision state decision circuit, it corresponds to sensor detection signal  $S_i$  and sensor detection signal  $S_i$ . Comparison with the threshold  $Th_i$  recognized to be a collision is performed (Step 160), if sensor detection signal  $S_i$  is more than threshold  $Th_i$ , it will be judged as the required major accident of an accident report, and the judgment of being the collision applicable to the inflator ON is performed (Step 162). If it is an inflator-on judging, the Squibb signal will be outputted to an inflator (Step 180). On the other hand, since it is judged with the major accident even if it is the collision which does not expand the air bag 30, The position information and the conflicting mode information which are written in RAM are read, and the instructions to which a hurry call is made to transmit are outputted to the radio aids etc. which have predetermined emergency organization by a means of communication (Step 200).

[0024] On the other hand, when sensor detection signal  $S_i$  is less than the threshold  $Th_i$ , it is at the time at which it can usually run, and it continues during a run in this case, a position information request is repeated, and the position information in RAM is updated to the newest thing. The end of a run is carried out, in getting off, it makes the ignition switch 13 into an OFF state, but the positioning data update circuit of the navigation system 10 also serves as OFF at this time (Step 170,210).

[0025] Although conflicting mode information is also accumulated in RAM besides position information in the above explanation, information indispensable as a hurry call is position information, and conflicting mode information is additional information. Therefore, also when conflicting mode information is used as the system collected as collection data or it collects, it can be chosen whether it is adopted as transmit information.

[0026]

[Effect of the Invention] According to this invention, so that clearly from the above explanation it not only ensures a crew member's safety at the time of a collision, but, The hurry call of an accident occurrence position etc. can be notified to the radio aids which have predetermined emergency instruction organization, and the effect that transportation in a hospital, accommodation, etc. can ensure reservation of the safety of the crew member after an accident is done so.